

**FEDERAL ENERGY
MANAGEMENT
PROGRAM
(FEMP)**

**THIRD ANNUAL
REPORT TO
THE PRESIDENT
FY 1979**

**OFFICE OF THE ASSISTANT SECRETARY
FOR CONSERVATION AND SOLAR ENERGY
OFFICE OF FEDERAL PROGRAMS
DEPARTMENT OF ENERGY**

AUGUST 1980

ENERGY MANAGEMENT

IN THE

FEDERAL GOVERNMENT

ANNUAL REPORT

U.S. DEPARTMENT OF ENERGY
FEDERAL ENERGY MANAGEMENT PROGRAM
AUGUST 1980

PREFACE

This third annual report summarizes the activities and performance of Federal departments and agencies in energy conservation since FY 1975, with special attention given to the efforts in FY 1979. The Federal energy conservation effort is monitored by the Department of Energy (DOE) and involves 69 Executive departments and agencies.

Annual reports are required to be submitted by each of these agencies in accordance with the reporting requirements of Executive Order 11912, Section 10, as amended by Executive Order 12003. These agency reports cover the energy used in buildings and facilities, and general operations. Executive Order 12003, dated July 20, 1977, establishes FY 1975 as the base year for the Federal Energy Management Program (FEMP). Accordingly, the report uses FY 1975 as the baseline year and 1979 as the comparative year.

This report is an abbreviated interim version which provides a transition into a comprehensive and consolidated report to be submitted annually during the month of February. The February reporting date will result in a more timely and useful report, and in addition, will permit the consolidation of the reporting requirements of the Executive Order with the reporting requirements of Title V, Part 3 of the National Energy Conservation Policy Act (NECPA) of 1978 (P.L. 95-619).

ACKNOWLEDGEMENTS

The information contained in this report is based in part on materials submitted to the Department of Energy by the Federal agencies involved in the Federal Energy Management Program. The Department of Energy acknowledges its appreciation to these agencies:

Department of Agriculture	Federal Trade Commission
Department of Commerce	Foreign Claims Settlement Commission of the United States
Department of Defense	General Services Administration
Department of Education	Inter-American Foundation
Department of Energy	Interstate Commerce Commission
Department of Health and Human Services	Merit Systems Protection Board
Department of Housing and Urban Development	National Aeronautics and Space Administration
Department of the Interior	National Capital Planning Commission
Department of Justice	National Credit Union Administration
Department of Labor	National Endowment for the Arts
Department of State	National Labor Relations Board
Department of Transportation	National Science Foundation
Department of the Treasury	National Transportation Safety Board
ACTION	Nuclear Regulatory Commission
Administrative Conference of the United States	Occupational Safety and Health Review Commission
Agency for International Development	Office of Management and Budget
American Battle Monuments Commission	Office of Personnel Management
Appalachian Regional Commission	Overseas Private Investment Corporation
Board for International Broadcasting	Panama Canal Commission
Central Intelligence Agency	Pennsylvania Avenue Development Corporation
Civil Aeronautics Board	Pension Benefit Guaranty Corporation
Commission on Civil Rights	Railroad Retirement Board
Commission of Fine Arts	Securities and Exchange Commission
Commodity Futures Trading Commission	Selective Service System
Community Services Administration	Small Business Administration
Consumer Product Safety Commission	Tennessee Valley Authority
Environmental Protection Agency	United States Arms Control and Disarmament Agency
Equal Employment Opportunity Commission	United States International Communication Agency
Export-Import Bank of the United States	United States International Trade Commission
Farm Credit Administration	United States Postal Service
Federal Communications Commission	United States Soldiers' and Airmen's Home
Federal Deposit Insurance Corporation	Veterans Administration
Federal Election Commission	
Federal Home Loan Bank Board	
Federal Maritime Commission	
Federal Mediation and Conciliation Service	
Federal Reserve System	

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ENERGY MANAGEMENT
IN THE FEDERAL GOVERNMENT

ANNUAL REPORT
TO THE PRESIDENT
OF THE UNITED STATES
FISCAL YEAR 1979

Submitted in Accordance with
Executive Order 12003 of July 20, 1977

United States Department of Energy
Federal Energy Management Program

August 1980

Chapter 1

OVERVIEW: ENERGY MANAGEMENT IN THE FEDERAL GOVERNMENT

1.0 INTRODUCTION

The Federal Government is the largest consumer of energy in the United States, accounting for nearly 2.2 percent of the total national energy use in 1979.

The Federal Government used this energy in over 520,000 buildings, 100,000 automobiles, 400,000 mission and tactical-related vehicles, as well as by a Federal work force (military and civilian) nearly 5 million strong. Energy use by the government in FY 1979 was 1.7 quadrillion British Thermal Units (BTU x 10¹⁵), or approximately 295.6 million barrels of oil equivalent (MBOE), at an estimated cost of 5.6 billion dollars. This represents an energy savings of 5.9 percent over the 1975 baseline, but an increase in energy use of 1.1 percent over 1978, as shown in Figure 1-1. Cumulative savings since 1975 comprise 71.6 MBOE, an amount sufficient to heat approximately 2.9 million average American homes for one year.

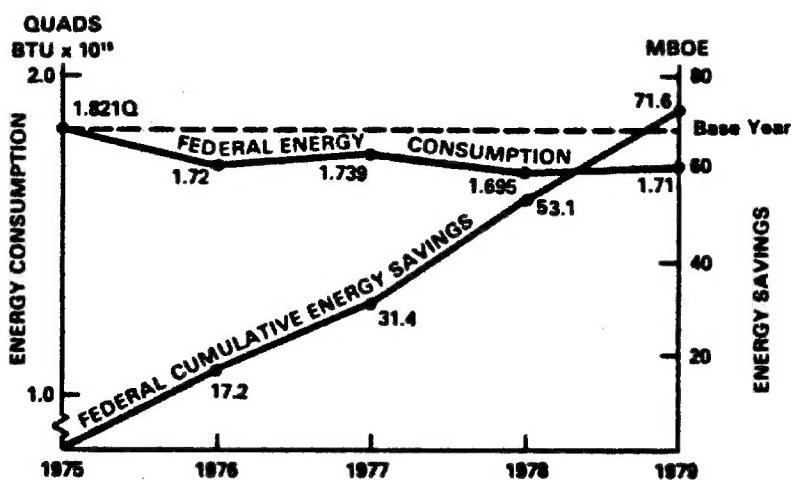


FIGURE 1-1 TOTAL ENERGY CONSUMPTION AND SAVINGS BY THE FEDERAL GOVERNMENT, FY 1975 - FY 1979

In Quads (BTU x 10¹⁵) and MBOE
(Millions Barrels of Oil Equivalent)

The following figure shows Federal energy consumption during FY 1979 by energy source:

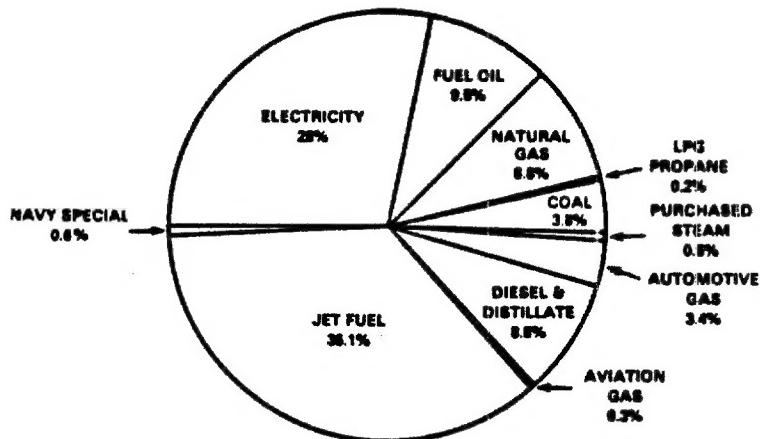


FIGURE 1-2 FEDERAL ENERGY CONSUMPTION
IN 1979 BY FUEL SOURCE

Federal energy use is reported in the categories specified by Executive Order 12003; namely, Buildings and Facilities and General Operations. Buildings and Facilities account for 51 percent of the total energy use, and General Operations the remainder. Sixty-nine departments and agencies report energy use to the Department of Energy.

The ten largest energy users represent 98.4 percent of the total consumption. They are listed in Figure 1-3 in order of energy use:

<u>AGENCY</u>	<u>PERCENT OF TOTAL FEDERAL ENERGY USE</u>
Department of Defense	80.7
Department of Energy	5.1
U.S. Postal Service	3.1
General Services Administration	2.6
Veterans Administration	2.2
Department of Transportation	1.6
National Aeronautics and Space Administration	1.3
Department of Interior	.7
Department of Agriculture	.6
Department of Health and Human Services	.5
	98.4 percent

FIGURE 1-3 - MAJOR ENERGY CONSUMING AGENCIES

The performance of the Department of Defense is critical to the success of the Federal Energy Conservation Program, as can be seen below in Figure 1-4. Energy and national defense are inseparable, for combat readiness requires prodigious amounts of energy, and more than 50 percent of the Defense energy use is dependent upon energy used in operational training and readiness.

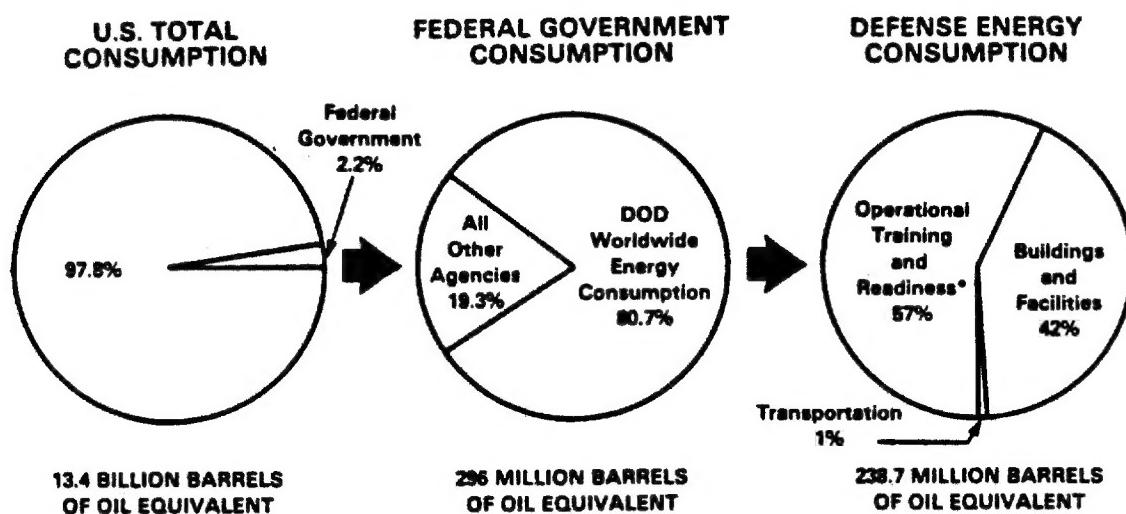


FIGURE 1-4 ENERGY CONSUMPTION IN FY 1979

*Operational Readiness includes activities related to ensuring the capability of a unit, ship, weapon system, or equipment to perform the missions or functions for which it is designed or organized; Operational Training is that training used to develop, maintain, or improve the operational readiness of individuals or units.

The Federal Energy Management Program (FEMP) of the Department of Energy serves as the central coordination agency for all energy conservation activities of the Federal government.

1.1 THE FEDERAL ENERGY MANAGEMENT PROGRAM

The Federal Energy Management Program (FEMP) of the Department of Energy is committed to achieving specific objectives. The overall FEMP objectives are to:

- o Reduce total energy consumption in the Federal Government;
- o Within that total, alter the fuel mix to reduce dependence on foreign oil, and increase the use of renewable energy sources;
- o Set an example for the nation and publicize program methods and results.

Through Federal achievement of cost-effective reductions in energy use, consumption dropped 5.9 percent as compared to 1975 levels -- a savings of 18.5 million barrels of oil equivalent. Table 1-1, on page 7, exhibits the energy consumption and savings in fiscal years 1975 through 1979 for the twenty-five largest energy-consuming agencies involved in the FEMP program. It should be noted that a number of agencies experienced increases in energy consumption during FY 1979. These increases are not necessarily an indication of a lack of energy conservation efforts by the agencies, but rather, reflect a combination of factors that resulted in increased energy use. These factors include agency increases in building inventories, as well as increased mission requirements and tempo of operations. Individual agencies missions and energy conservation programs will be discussed in the consolidated report to be submitted to the President in February, 1981.

To achieve these objectives, FEMP emphasizes low cost - no cost operational and maintenance changes as first priority. However, in order to achieve the

established goals, substantial investments must be made by each agency to retrofit buildings and facilities. Moreover, the Federal government must achieve these energy reductions without adversely affecting the mission of each agency.

TABLE I-1 FEDERAL ENERGY CONSUMPTION FY 1976 TO FY 1979
(IN BILLIONS OF BRITISH THERMAL UNITS (BTU X 10⁹)
AND MILLIONS BARRELS OF OIL EQUIVALENT (MBOE))¹

Agency	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	Percent * Reduction FY1975-FY1979	Percent * Reduction FY1978-FY1979
	Total Btu x 10 ⁹						
DOD	1,487,093.2	1,386,805.2	1,401,224.8	1,361,753.9	1,384,251.5	6.9	+ 1.6
DOE	86,636.4	91,703.3	88,050.3	87,891.0	87,639.3	+ 1.2	.3
USPS	55,510.0	54,032.5	58,941.0	54,942.2	52,546.5	5.4	4.4
GSA	44,853.0	43,836.3	43,785.5	44,622.9	44,870.1	+ .03	+ .6
VA	39,208.5	36,467.3	37,945.0	39,444.9	38,464.7	1.9	2.5
DOT	27,098.4	27,014.3	28,315.3	28,515.8	27,351.4	+ .9	4.1
NASA	26,418.0	25,138.6	23,978.1	22,449.7	22,394.3	.2	
DOI	12,447.9	13,121.5	13,521.8	12,182.0	12,386.9	.5	+ 1.7
Agriculture	11,928.8	11,606.7	10,772.7	11,222.8	11,593.4	2.8	3.3
MHS	9,264.0	9,590.1	9,927.1	9,555.7	9,715.7	+ 4.9	+ 1.7
Justice	6,157.1	7,172.1	7,359.3	7,175.2	7,402.7	+ 20.2	+ 3.2
Treasury	4,250.8	4,184.7	4,268.5	4,322.3	4,194.1	1.3	2.9
Commerce	3,599.9	3,097.2	3,878.7	3,812.1	3,924.8	+ 9.0	+ 2.9
Panama Canal	2,490.5	2,533.9	2,636.6	2,552.0	2,462.7	1.1	3.5
Labor	1,675.1	1,631.8	1,757.7	1,771.2	1,695.8	+ 1.2	4.2
EPA	1,259.1	604.1	557.4	1,330.7	1,258.2	.07	5.4
TVA	764.3	900.6	1,157.4	1,110.7	1,134.0	+ 48.4	+ 1.4
MUD	375.0	308.1	315.5	336.5	293.8	21.7	12.7
Others ¹	615.9	717.3	726.8	771.7	796.2	+ 29.3	+ 3.2
Total Btu x 10 ⁹	1,821,656.0	1,722,065.6	1,739,119.5	1,695,771.3	1,714,376.1		
MBOE	314.1	296.9	299.8	292.4	295.6	TOTAL 5.89%	+ 1.10
Annual Savings From FY 1975 Btu x 10 ⁹	99,590.4	82,536.5	125,884.7	107,279.9			
MBOE	17.2	14.2	21.7	18.5			
Cumulative Savings From FY 1975 Btu x 10 ⁹	99,590.4	182,126.9	308,011.6	415,291.5			
MBOE	17.2	31.4	53.1	71.6			

* + refers to percent increase over base year

¹Other includes Civil Aeronautics Board, Federal Communications Commission, Interstate Commerce Commission, National Science Foundation, Office of Personnel Management, Small Business Administration and Department of State.

²Conversion factor: 5,800,000 Btu = one barrel of crude oil equivalent.

³The second annual report stated that the energy use in FY 1978 was 5.9 percent lower than energy use in FY 1975. Agency adjustments to refine the FY 1975 baseline energy use data since that time result in FY 1978 energy consumption which is 6.9 percent lower than FY 1975, rather than 5.9 percent lower, as was previously reported.

Specific functions of the FEMP program are part of this integrated approach to energy management and include:

- Promoting energy conservation within the Federal government
- Developing and publishing energy conservation guidelines, standards, rules, and instructions pertaining to or relating to Federal buildings and general operations
- Evaluating Agency buildings and operations plans
- Developing the Federal Ten-Year Buildings and Operations Energy Management Plan.
- Providing periodic and Ad Hoc reports to the public, the Congress and the White House
- Reporting annual Federal agency performance to the Congress and President
- Supporting the Interagency Federal Energy Policy Committee ("656" Committee)
- Providing public education programs for energy conservation and carpooling arrangements
- Promoting conversion to alternative fuels to reduce imported oil usage.

The Federal Energy Management Program is divided into two broad program areas: the Buildings Program and the General Operations Program. The Buildings Program is intended to reduce the amount of energy consumed through increasing energy efficiency in cooling, heating, lighting, and ventilating of Federal buildings. The General Operations Program places emphasis on reducing

the agency energy use through increasing energy efficiency in the transportation of goods and people, in providing services, in conducting industrial or production process operations, in maintaining defense training and operational readiness, in conducting research experiments and in many other operational activities.

The Federal energy conservation program provides for duplication of successful Federal initiatives in state and local government programs. The Federal Energy Management Program is also involved in the promotion of other areas of energy conservation such as employee awareness, carpooling and vanpooling, alcohol fuels, electric vehicles, recycling, solar and photovoltaics and energy efficiency standards for products.

The Federal Ten-Year Energy Management Plan will consist of the plans for the two program areas of the FEMP program: Buildings and Facilities, and General Operations. The buildings portion of the Plan, to be published in October 1980, addresses how and when established objectives will be reached, and the results to expect of individual conservation investments by agencies. Agency buildings plans are being used to formulate the Federal Ten-Year Buildings Energy Management Plan. Lighting and thermal efficiency standards as required by Section 381 of the Energy Policy and Conservation Act of 1975, will be published as an appendix to the Plan.

The Federal General Operations Plan, the second part of the overall ten-year plan, will be prepared upon receipt of the agency operations plans in the next fiscal year.

The Buildings and Facilities and General Operations programs are discussed in detail in Chapters 2 and 3 respectively.

In the Second Annual Report to the President on Energy Management, the DOE stated that, in the following year, it must take a "more aggressive leadership role through the establishment and promotion of generally applicable management policies, monitoring, feedback, and technical assistance." The issuance of four key documents in 1979 and 1980 has served to provide definitive mandates to reduce energy consumption throughout the government. These documents are: Guidelines for Preliminary Energy Audit Procedures, Guidelines for Buildings Plans, General Operations Guidelines, and the Life Cycle Costing Guidelines. Technical workshops to assist in administering these guidelines in agency programs have been in place since early 1979, and the Interagency Federal Energy Policy Committee ("656" Committee) has established working groups to act as vehicles to generate interagency cooperative solutions to common energy management problems.

The DOE further stated that "the reporting of accurate, comparable data must be emphasized by top management in the Department of Energy and the 69 Executive departments and agencies involved in the Federal Energy Management Program." This issue is being resolved at the present time through one of the "656" Committee Working Groups. The Data Gathering and Reporting Working Group has been charged "to define the data collection and reporting actions and requirements necessary to ensure an accurate and credible record of energy conservation in the Federal Government." To achieve the objectives of this working group and the Federal Energy Management Program, commitment by top-level management in the form of personal attention, resources and manpower must remain a top priority in coming years.

Chapter 2

ENERGY MANAGEMENT IN BUILDINGS AND FACILITIES

2.0 INTRODUCTION

Over fifty percent of the total Federal energy consumption is used in the operation of over 520,000 Federal buildings and facilities. Energy consumption in FY 1979 decreased by 6.4 percent as compared to FY 1975, and by .9 percent as compared to 1978. The cost of energy consumed in Federal buildings and facilities in FY 1979 is estimated to surpass more than 2.4 billion dollars.¹ Energy consumption and savings by the twenty-five largest energy users in buildings and facilities from FY 1975 to 1979 are shown in Table II-1, page 12.

Several agencies have reported difficulties in separately reporting industrial or production process type energy use in buildings from that energy used to cool, heat, light and ventilate the building envelope. Inclusion of energy-intensive industrial and production equipment energy use in the agency data results in high energy use per gross square foot numbers. Several efforts are underway to overcome these difficulties.

The Energy Policy and Conservation Act (ECPA), Executive Order 12003, and the National Energy Conservation Policy Act (NECPA) of 1978, established the following requirements as related to the conservation of energy in Federal buildings:

¹Estimated using DOE 1979 average energy prices, Monthly Energy Review, DOE/EIA 0035/80(07), U.S. Department of Energy, Energy Information Administration.

TABLE II-1 FEDERAL ENERGY USE IN BUILDINGS AND FACILITIES FY 1975 TO FY 1979
(IN BILLIONS OF BRITISH THERMAL UNITS (BTU X 10⁹)
AND MILLIONS BARRELS OF OIL EQUIVALENT (MBOE))^{1,2}

Agency	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	Percent * Reduction FY1975-FY1979	Percent * Reduction FY1978-FY1979
	Buildings and Facilities						
DOD	640,314.4	598,420.6	602,125.5	591,893.1	587,217.9	.3	.78
DOE	84,727.1	89,610.6	85,934.0	85,509.9	85,400.9	+ .8	.12
USPS	44,269.0	43,701.8	47,201.5	43,824.6	41,614.3	6.5	4.7
GSA	44,684.6	43,661.3	43,609.5	44,453.1	44,714.5	+ .06	+ .58
VA	38,587.7	35,834.3	37,331.0	38,034.7	37,853.8	1.9	2.5
DOT	16,030.7	14,798.7	15,081.4	15,978.2	15,483.4	3.4	3.1
NASA	24,696.7	23,510.2	22,252.4	20,768.4	20,562.1	16.7	.9
DOI	9,140.8	9,656.1	10,120.8	8,663.9	8,729.9	4.5	+ .7
Agriculture	6,755.7	6,056.1	5,477.2	5,857.6	5,751.0	14.8	+ 5.4
MHS	8,521.1	8,818.5	9,230.6	8,098.5	9,089.5	+ 6.7	+ 2.1
Justice	4,306.6	4,976.3	5,359.6	5,216.1	5,440.4	+ 26.3	+ 4.3
Treasury	2,010.1	1,959.8	2,032.8	2,008.3	2,011.1	.34	3.7
Commerce	2,469.9	2,476.8	2,483.0	2,463.5	2,539.7	+ 2.8	+ 3.1
Panama Canal	1,288.0	1,355.7	1,367.8	1,358.9	1,362.0	+ 5.7	+ .22
Labor	1,827.9	1,384.0	1,860.5	1,395.0	1,318.7	7.6	5.4
EPA	1,126.1	488.1	430.0	1,209.0	1,134.6	+ .75	6.1
TVA	253.9	348.0	609.2	509.7	503.8	+ 98.4	1.1
MUD	0.0	0.0	0.0	0.0	0.0	0	0
Others ¹	320.1	405.5	407.8	436.0	468.4	+ 46.3	+ 7.4
Total BTU x 10 ⁹	930,938.0	887,430.8	893,331.4	878,550.5	870,996.8		
MBOE	160.5	153.0	150.0	151.5	150.2	TOTAL 6.48	.868
Annual Savings From FY 1975 BTU x 10 ⁹		\$3,507.6	37,606.6	52,379.5	59,941.2		
		7.5	6.5	9.0	10.3		
Cumulative Savings From FY 1975 BTU x 10 ⁹		\$3,507.6	81,114.2	133,493.7	193,434.9		
		7.5	14.0	23.0	33.5		

* + refers to percent increase over base year

¹Other includes Civil Aeronautics Board, Federal Communications Commission, Interstate Commerce Commission, National Science Foundation, Office of Personnel Management, Small Business Administration and Department of State.

²Conversion factor: 5,800,000 BTU = one barrel of crude oil equivalent.

Energy Policy and Conservation Act

- Develop a ten year plan for energy conservation in Federal buildings, to include: the establishment of mandatory lighting and mandatory thermal efficiency standards, restrictions on hours of operations, thermostat controls, and other conditions of operation.

Executive Order 12003

- DOE shall establish the ten-year energy conservation plan
- DOE shall publish guidelines, requirements and procedures for agency buildings plans
- DOE shall establish a uniform life cycle costing methodology for investments in Federal buildings
- Agencies shall conduct preliminary energy audits.

National Energy Conservation Policy Act

- Agencies shall make life cycle cost-effective retrofits of Federal buildings
- DOE shall establish a uniform life cycle costing methodology and procedures for preliminary energy audits
- Agencies shall conduct energy audits of buildings
- Agencies shall use the DOE life cycle costing methodology to evaluate energy-saving investments in Federal buildings
- DOE shall establish energy performance targets.

In accordance with the requirements placed upon the Department of Energy and other Federal agencies, the Federal regulation, "Procedures for Preliminary Energy Audits" was published by DOE. Agencies completed audits of buildings greater than 30,000 gross square feet and DOE reported the results to Congress in FY 1978. Agency audits of buildings 1,000 to 30,000 gross square feet in size have also been completed and a report on audit results will be submitted to Congress in October 1980.

The DOE has developed and published procedures for life cycle costing analyses of investments in Federal buildings. This methodology is currently in use by Federal agencies to evaluate the cost-effectiveness of installing energy-saving investments, including renewable energy sources, in new and existing Federal buildings.

The DOE has also issued the guidelines, requirements, and procedures for agency ten year buildings plans. The agency plans have been submitted to the DOE and are being evaluated for plan content relative to the requirements of Executive Order 12003 and the buildings guidelines.

Each of the guidelines published by the DOE that relate to buildings and facilities energy management is discussed in more detail in the following sections.

2.1 AGENCY BUILDING PLANS

On November 14, 1979, the Department of Energy published in the Federal Register the regulation, "Guidelines for Buildings Plans" which established specific requirements for the content of agency buildings plans, as well as several performance-oriented goals and objectives, including:

- Achieve a 20 percent reduction in average energy use per gross square foot in existing buildings in 1985 as compared to the 1975 baseline energy use;
- Achieve a 45 percent reduction in the design energy use per gross square foot of new buildings in 1985 as compared to the 1975 baseline energy use;
- Set a goal for reducing energy use in leased existing buildings.
- Set a goal for installing renewable energy systems in existing and new Federal buildings; and
- Achieve a 30 percent reduction in the use of petroleum-based fuels in 1985 as compared to the use in 1975.

The guidelines directed those agencies owning or leasing buildings to submit their ten-year buildings plans to the DOE for evaluation and approval before May 14, 1980. The results of the evaluations will be used by the DOE in the formulation of the overall Federal Ten-Year Buildings Plan. Thus far, fourteen of the twenty agencies independently owning or leasing buildings have submitted plans to the DOE. These agencies are:

- | | |
|-------------------------------------|---|
| (1) Department of Defense | (8) National Aeronautics and Space Administration |
| (2) Department of Commerce | (9) Department of Labor |
| (3) Department of Energy | (10) U.S. Postal Service |
| (4) Environmental Protection Agency | (11) Department of Treasury |
| (5) General Services Administration | (12) Veterans Administration |
| (6) Department of the Interior | (13) Department of Health and Human Services |
| (7) Department of Justice | (14) Tennessee Valley Authority |

The DOE has requested that the remaining agencies expedite submission of their plans.

Specific progress toward each of the goals set in Executive Order 12003 and "Guidelines for Buildings Plans," are detailed in Table II-2 and discussed in section 2.1.1.

2.1.1 Specific Progress Toward Agency Goals

Those agencies that own or lease buildings are also required by Executive Order 12003 to submit an Annual Report to the Department of Energy which describes agency progress toward achievement of the established Presidential goals. In some instances, the information is incomplete. The DOE is working with these agencies to correct individual problems in measurement. Table II-2 provides information on progress made by agencies in those cases where the data was adequate to permit quantitative measurement.

Some of the key findings are discussed in the following sections.

**TABLE II-2 AGENCY PROGRESS TOWARD GOALS IN OWNED FEDERAL BUILDINGS
(IN BRITISH THERMAL UNITS (BTU X 10⁹) AND GROSS SQUARE FEET (GSF))**

AGENCY	PERCENT OF TOTAL BUILDINGS ENERGY USE FY 1979	FY 1975				FY 1979				PERCENT REDUCTION BTU/GSF FY 1975-1979	PROGRESS TOWARD 30% REDUCTION IN PETROLEUM FUELS*
		TOTAL NUMBER OF BUILDINGS	GROSS SQUARE FEET	BTU X 10 ⁹	BTU/GSF	TOTAL NUMBER OF BUILDINGS	GROSS SQUARE FEET	BTU X 10 ⁹	BTU/GSF		
AGRICULTURE	.06	* 18,691	* 29,193,000	NR	NR	NR	NR	NR	NR	NR	18.6
COMMERCE	.29	1,056	5,840,125	1,675.8	286,960	925	5,833,240	1,723.7	295,512	+2.9	50.4
DEFENSE	67.4	* 311,725	2,289,126,269	640,314.4	279,720	395,349	2,128,739,000	587,218.0	275,953	1.4	13.1
ENERGY ¹	9.8	5,850	90,600,000	83,430.0	920,861	6,246	94,045,000	84,094.0	894,189	2.9	17.5
EPA	.13	81	919,000	577.0	627,866	82	1,088,000	643.0	449,081	20.6	19.9
FCC	.003	* 75	* 115,000	NR	NR	39	89,807	NR	NR	NR	11.8
GSA	5.1	2,280	209,476,806	41,422.0	197,743	2,723	231,356,909	43,156.0	186,536	5.6	6.2
HHS	1.0	2,088	18,622,000	8,521.2	457,587	2,284	21,106,000	9,069.5	430,659	5.9	17.1
INTERIOR	1.0	23,252	51,360,369	9,140.9	177,976	23,237	56,063,318	8,730.9	158,561	10.9	8.1
JUSTICE	.62	1,833	13,725,023	5,142.0	374,644	1,918	15,868,664	5,799.0	365,437	2.6	+20.8
LABOR ¹	.151	13	8,000,000	1,400.0	175,000	1,189	8,015,400	1,360.4	168,426	3.8	13.4
NASA	2.4	* 2,584	32,000,000	25,069.0	783,406	2,429	32,572,000	20,631.0	633,397	19.1	29.9
NSF	.06	94	605,426	291.4	481,314	108	804,894	438.7	546,041	+13.2	+91.9
PANAMA CANAL	.156	* 2,895	* 12,986,000	NR	NR	NR	NR	NR	NR	NR	NA
U.S. POSTAL SERVICE ¹	4.7	* 28,140	178,000,000	44,268.8	248,701	32,750	192,639,000	41,413.9	213,727	14.1	41.8
STATE	NR	* 2,070	* 18,132,000	NR	NR	NR	NR	NR	NR	NR	NR
TVA	.058	481	1,326,200	NA	NA	621	7,837,300	NA	NA	NA	5.9
TRANSPORTATION	1.8	11,692	31,837,000	15,946.0	500,864	12,202	34,626,000	15,564.0	449,200	10.3	+2.6
TREASURY	.23	80	3,094,000	1,647.5	532,480	125	3,790,000	1,794.0	473,361	11.1	+67.9
VETERANS	4.3	5,358	106,910,000	39,203.0	366,692	5,468	112,080,000	38,418.0	342,773	6.5	10.3
TOTAL	100%	420,337	3,040,116,018	NA	NA	NA	NA	NA	NA	3.1	12.9%

FOOTNOTES ARE AN INTEGRAL PART OF THIS TABLE.

NR = NOT REPORTED

NA = NOT AVAILABLE

* +REFERS TO PERCENT INCREASE OVER BASE YEAR.

2.1.1.1 Federally Owned Existing Buildings

- The goal for Federal agencies with owned existing buildings is to achieve a 20 percent reduction in average energy use per gross square foot of floor space in 1985, as compared to the baseline energy use in 1975.
- Table II-2 provides the percent reduction in average energy use per gross square foot in 1979, as compared to 1975 for those agencies for which progress could be measured. The reductions ranged from 19.1 percent for NASA to an increase of 13.2 percent for the National Science Foundation.

2.1.1.2 Federally Leased Existing Buildings

- Because of the difficulties in effecting energy use reductions in leased existing buildings due to the constraints of existing lease contracts, and the lack of complete information on energy consumption in leased buildings, no Federal energy reduction goal has been established. Instead, agencies have been directed to establish individual agency goals in these buildings.

2.1.1.3 Federally Owned and Leased New Buildings

- The goal for Federal agencies with new buildings is to achieve a 45 percent reduction in the design energy use per gross square foot in 1985, as compared to the 1975 baseline energy use.

- Since a "new Federal building" is defined as one for which construction was not completed prior to November 9, 1978, and the design of which can be feasibly modified after November 14, 1979, presently there is no significant energy consumption experience to report for new buildings.

2.1.1.4 Renewable Energy Systems

- To fulfill this goal, each agency must provide in its building plan to achieve a goal to install renewable energy systems in new and existing Federal buildings. Because the goal is set on an individual agency basis and the agency buildings plans were received in this year, meaningful conclusions cannot be drawn except on an agency by agency basis. The Consolidated Annual Report to be submitted in February 1981 will discuss this item in detail.

2.1.1.5 Progress Toward Petroleum-Based Fuel Reduction

- As part of the Buildings Plan guidelines, the Department of Energy set a goal for each agency to achieve a 30 percent reduction in the use of petroleum-based fuels in buildings and facilities by 1985 as compared to 1975 usage. Only those agencies that independently own or lease buildings are responsible for the attainment of this goal. Overall, by the end of FY 1979, agencies had reached a 12.9 percent reduction, which is 43 percent of the way toward the reduction goal of 30 percent in use by 1985, and indicates a shift away from the use of petroleum-based fuels. Specific agency achievements are detailed in Table II-2.

2.2 PRELIMINARY ENERGY AUDITS

Title V, Part 3 of the NECPA requires each Federal agency to conduct preliminary energy audits of all buildings under agency jurisdiction, occupancy or control that contain 30,000 or more gross square feet of floor space and report to Congress before August 15, 1979. The agencies were further required to audit buildings with 1,000 square feet or more, but less than 30,000 square feet, and report the results to DOE so that DOE could prepare a consolidated report to Congress by August 15, 1980.

Energy audits of all Federal buildings with 1000 or more gross square feet have been completed. The final report to be submitted to Congress will cover buildings of all sizes, inclusive of those buildings reported upon in 1979 that were 30,000 or more gross square feet. This report will be published in October 1980.

2.3 LIFE CYCLE COST GUIDELINES

The NECPA and Executive Order 12003 set requirements upon the Department of Energy to develop a practical and effective method for estimating and comparing the life cycle costs of Federal buildings. The Federal Energy Management Program (FEMP) of the DOE was charged with developing and prescribing the procedures to be applied in determining the cost-effectiveness of energy-conserving investments in Federal buildings.

In response to these directives, FEMP published the rule entitled "Methodology and Procedures for Life Cycle Cost Analyses" in the Federal Register on January 23, 1980. (Title 10, Code of Federal Regulations, Part 436, Subpart A, Sections 436.10-.29). Life cycle costing (LCC) is a systematic evaluation process for determining the cost-effectiveness of installing renewable and energy-conserving systems in Federal buildings. A LCC analysis provides an evaluation of the net effect, over time, of reducing fuel costs by purchasing, installing, maintaining, operating, repairing, and replacing energy-conserving features.

On June 30, 1980, the Energy Security Act, P.L. 96-294, was signed into law. Section 405 of the Act amended Section 545 of the NECPA to require the LCC methodology to be based on "marginal fuel costs," a 7 percent real discount rate, and a maximum 25 year "study period." Due to the complexities in developing marginal prices, the DOE began rulemaking on the issue in late August 1980, with the final rule expected to become effective in 1981. However, the other provisions of the Energy Security Act related to LCC are expected to be published and become effective in December, 1980.

2.4 SOLAR IN FEDERAL BUILDINGS DEMONSTRATION PROGRAM

The Solar in Federal Buildings Program (SFBP) was authorized by Title V, Part 2 of the NECPA. The intent of the SFBP is to provide a program for Federal agencies to demonstrate the application of solar heating and cooling systems in Federal buildings.

In May 1980, the Department of Energy announced that sixteen agencies would receive a total of 31 million dollars for the design, construction and installation of solar systems. Nine hundred proposals for solar systems were submitted, and 843 were selected for funding. They will be located in all fifty states and the District of Columbia. It is expected that design and construction of all the projects will be completed in six to eighteen months. Annual energy savings to accrue from these projects is estimated at 127 BTU's x 10⁹, or the equivalent of 22,000 barrels of oil.

2.5 FEDERAL PHOTOVOLTAIC UTILIZATION PROGRAM

The Federal Photovoltaic Utilization Program (FPUP) was established by Title V, Part 4, of the NECPA to accelerate the growth of the photovoltaic industry, to reduce fossil fuel consumption by the Federal government, and to develop performance data to enhance market development and industry acceptance.

Major projects are underway to provide solar electricity in such end-use applications as telecommunications, water pumping, navigational aides and grid-connected building applications to produce electricity for schools, office buildings and residences on Federal facilities. Thirteen agencies currently participate in the Federal Photovoltaic Utilization Program.

Chapter 3

ENERGY MANAGEMENT IN GENERAL OPERATIONS

3.0 INTRODUCTION

The use of energy in general operations accounts for 49 percent of the total energy consumption by the Federal government. In FY 1979 Federal agencies reduced energy consumption in general operations by 5.3 percent as compared to FY 1975, but increased energy use by 3.2 percent as compared to FY 1978, as shown in Table III-3, page 24.

Close examination of the information reveals that this increase is primarily due to an increase of 3.5 percent by Department of Defense. DOD attributes the increase to the increased tempo of operations in the Indian Ocean and Mideast, and to increased emphasis on aviation readiness and training during the last two quarters of FY 1979. The bulk of this increase is concentrated in two fuels, jet fuel and navy special. However, separation of the DOD administrative energy use from the operational training and readiness energy use reveals that the amount of fuel used for administrative purposes actually declined by 6.9 percent in FY 1979 as compared to FY 1978, while the fuel used in defense training and readiness increased by 3.8 percent. In fact, if this fuel use were excluded from the total operations energy use, the Federal government would show a 3.4 percent decrease in FY 1979 as compared to FY 1978, and a .5 percent decrease as compared to FY 1978 in the general operations fuel consumption. Clearly, increases in defense operational training and readiness fuel consumption in response to changing world events, drives the energy use trends of the entire Federal establishment.

TABLE III-1 FEDERAL ENERGY USE IN GENERAL OPERATIONS FY 1975 TO FY 1979
[IN BILLIONS OF BRITISH THERMAL UNITS (BTU X 10⁹)
AND MILLIONS BARRELS OF OIL EQUIVALENT (MBOE)]²

Agency	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	Percent Reduction FY1975-FY1979	Percent Reduction FY1978-FY1979
	General Operations						
DOD	846,778.8	788,388.6	799,099.3	769,860.8	797,033.6	5.0	+ 3.5
DOE	1,909.3	2,092.7	2,115.5	2,381.1	2,238.4	+ 17.2	5.9
USPS	11,241.0	11,130.7	11,739.5	11,517.6	11,132.2	-1.0	3.4
GSA	178.4	175.0	176.0	169.8	155.6	12.7	8.3
VA	620.8	633.0	614.0	610.2	610.9	1.6	+ .11
DOT	11,067.7	12,215.6	12,433.9	12,537.6	11,868.0	+ 7.2	5.3
NASA	1,721.3	1,620.4	1,725.7	1,681.3	1,832.2	+ 6.4	+ 8.9
DOI	3,307.1	3,465.4	3,401.0	3,518.1	3,657.0	+ 10.6	+ 3.9
Agriculture	5,173.1	5,550.6	5,295.5	5,765.2	5,841.6	+ 12.9	+ 1.3
MHS	742.9	771.6	688.5	657.2	626.2	15.7	4.7
Justice	1,050.5	2,195.8	1,999.1	1,959.1	1,962.3	+ 6.0	+ .16
Treasury	2,232.7	2,224.9	2,235.7	2,234.0	2,183.0	-2.2	2.3
Commerce	1,130.0	1,420.4	1,395.1	1,348.6	1,305.1	+ 22.6	2.7
Panama Canal	1,202.5	1,178.2	1,268.8	1,193.1	1,100.7	8.5	7.7
Labor	247.7	287.8	297.2	376.2	377.1	+ 52.2	.2
EPA	133.0	116.0	119.4	121.7	123.6	7.0	1.5
TYA	510.8	552.6	588.2	609.0	630.2	+ 23.5	+ 3.5
MUD	375.0	308.1	315.5	336.5	293.8	-21.6	12.7
Others ¹	295.8	311.8	319.0	335.7	327.8	+ 10.0	2.4
Total BTU x 10 ⁹	890,718.0	838,635.2	845,788.1	817,212.8	843,379.3		
MBOE	153.6	143.9	145.8	140.9	145.4	TOTAL 5.36	+ 3.26
Annual Savings From FY 1975							
BTU x 10 ⁹	56,082.8		44,929.9		73,505.2		
MBOE	9.7		7.7		12.7		
BTU x 10 ⁹					47,338.7		
MBOE					8.2		
Cumulative Savings From FY 1975							
BTU x 10 ⁹	56,082.8		101,012.7		174,517.1		
MBOE	9.7		17.4		30.1		
					221,055.8		
					38.2		

* + refers to percent increase over base year

¹ Other includes Civil Aeronautics Board, Federal Communications Commission, Interstate Commerce Commission, National Science Foundation, Office of Personnel Management, Small Business Administration and Department of State.

² Conversion factor: 5,000,000 BTU = one barrel of crude oil equivalent.

The cost of the energy consumed in general operations in 1979 is estimated at over 3 billion dollars--a higher cost than the cost of the fuel consumption in buildings and facilities.¹ This is attributable to the costly nature of the fuels used in general operations, for all are petroleum-based fuels, whereas in buildings only 19 percent of the fuel consumed is petroleum-based.

To reduce the Federal government's energy consumption in operations, each agency is required to develop and submit to the Department of Energy a General Operations Plan by January 31, 1981.

3.1 AGENCY GENERAL OPERATIONS PLANS

On July 1, 1980 the Department of Energy published in the Federal Register "Guidelines for Energy Management in the General Operations of the Federal Government" for Federal agencies to use in the development of an overall 10-year energy management plan. The plan to be prepared by each agency is intended to reduce the rate of energy consumption, to increase energy efficiency, to provide a methodology for reporting agency progress in meeting energy conservation goals, and to promote emergency energy conservation planning. The guidelines are designed to assure the earliest possible implementation of all known cost-effective energy conservation measures.

¹Estimated using DOE 1979 average energy prices, Monthly Energy Review, DOE/EIA 0035/80(07), U.S. Department of Energy, Energy Information Administration.

Since the mission and operating responsibilities of Federal agencies vary widely, planning in general operations consists of heterogeneous sets of agency specific measures, programs, projects and activities. Agency reports indicate that all major and most lesser energy-using agencies have ongoing programs to train, motivate, and educate employees; to review and revise administrative practices to make them more energy efficient; to eliminate unnecessary travel; to purchase fuel-efficient automobiles and other equipment; to curtail unnecessary activities; and to improve operational scheduling and maintenance. While progress has been made toward reducing energy use since FY 1975, the guidelines are expected to reinforce ongoing energy conservation efforts and provide a more comprehensive and coordinated planning process for achieving greater reductions and efficiencies in energy use.

The five functional areas in which agencies are to plan for the 1980-1990 period are: general transportation, services, industrial or production-type activities, operational training and readiness, and other. Each agency's General Operations Plan is to be submitted to the Department of Energy for review by January 31, 1981.

Fuel consumption and savings in general operations by the twenty-five largest energy users from FY 1975 to 1979 are detailed in Table III-1.

Common to all of the energy-consuming activities in general operations, is the energy used by agencies in general transportation. Transportation provides a unique opportunity to reduce energy consumption because of the many alternative means of increasing energy efficiency. For this reason, recent Presidential memoranda have established specific conservation goals for Federal agencies.

3.1.1 ENERGY CONSERVATION INITIATIVES

On April 10, 1979, the Presidential Memorandum entitled "Required 5 percent Reduction in Agency Energy Use" directed Federal departments and agencies to reduce energy consumption by 5 percent during the 12 month period April 1, 1979 to April 1, 1980 as compared to the energy consumption of the previous year period. To achieve this goal, certain actions were to be taken:

- "Set thermostats in all Federally-operated buildings, except where required for health and safety purposes, at not more than 65 degrees during working hours and 55 degrees during non-working hours for the heating season, and at not lower than 80 degrees for the cooling season.
- Reduce the use of all automotive fuels by 10 percent."

The Presidential Memorandum of February 1, 1980, "Required Reduction in Usage of Federal Motor Vehicles" reemphasized the previous goals and further required:

- "All Executive departments and agencies to make extraordinary efforts to meet or exceed the 10 percent goal required by the April 10 Presidential Memorandum.
- All agencies except the U.S. Postal Service to reduce the mileage traveled by government owned and leased vehicles during February and March 1980 by 10 percent as compared to the same period in 1979."

The performance of Federal departments and agencies against these goals varied widely. The 5 percent overall goal, which includes energy use in buildings as well as in general operations, was exceeded and substantial progress was made toward meeting the goals calling for reductions of 10 percent in automotive gasoline use and mileage. Overall, the Federal government achieved a 6 percent reduction against the 5 percent overall reduction goal, an 8.3 percent reduction toward the 10 percent reduction goal for automotive gasoline, and an 8.4 percent reduction against the 10 percent reduction in mileage goal. Specific agencies' progress against the goals are detailed below in Table III-2.

**TABLE III-2
AGENCY PROGRESS TOWARD PRESIDENTIAL GOALS**

AGENCY	5% OVERALL REDUCTION GOAL	10% AUTOMOTIVE GASOLINE REDUCTION GOAL	10% AUTOMOTIVE MILEAGE REDUCTION GOAL
AGRICULTURE	6.0	3.7	4.8
CAB	24.6	24.6	(6.2)
OPM	14.2	14.2	(6.4)
COMMERCE	3.6	13.4	(3.7)
DEFENSE	8.0	12.3	10.9
ENERGY	6.8	11.4	9.8
EPA	1.5	11.6	13.4
FCC	3.8	(4.7)	0.5
GSA	5.1	10.1	19.4
HEW	5.6	20.7	8.5
HUD	11.1	11.1	9.0
INTERIOR	5.0	6.4	13.0
ICC	0.5	0.5	(1.8)
JUSTICE	(0.5)	2.1	3.9
LABOR	(2.8)	12.5	(22.5)
NASA	6.7	11.2	13.8
NSF	1.5	3.4	7.0
PANAMA CANAL	9.9	9.7	15.9
POSTAL	6.5	4.9	EXEMPT
SBA	19.7	19.7	6.6
STATE	(0.4)	(0.4)	36.1
TVA	(2.2)	1.2	(6.8)
TRANSPORTATION	8.4	11.0	4.5
TREASURY	5.0	8.9	3.8
VETERANS	5.6	8.9	1.2
TOTAL	8.0%	8.3%	8.4%

Note: In accordance with the April 10, 1979 Presidential Memorandum, the Department of Defense fuel use in operational training and readiness was excluded from this goal.

The variance in the reported data in Tables III-1 and the other tables is due to a difference in reporting periods. The tables have only the last two quarters of FY 1979 in common, and the agencies achieved considerable reductions in energy use in the first two quarters of FY 1980.

Further, a recent Presidential Memorandum of July 23, 1980, entitled "Energy Efficiency in Federal Transportation Activities," directs Executive departments and agencies to:

- "Work toward twenty percent participation by employees in ridesharing and transit use, or, if that level has been attained, increase such participation by an additional twenty percent;
- Establish a program based on the Department of Energy's Driver Energy Conservation Awareness Training (DECAT) program, to train all drivers of government vehicles in fuel-efficient driving practices;
- Try to achieve an increase of ten percent in fleet miles per gallon through driver training, maintenance operations, route planning and procurement of fuel-efficient vehicles, tires and oils;
- Reprint and distribute materials to employees on fuel-efficient trip planning, vehicle selection, and operation and maintenance."

Progress toward achieving the goals of each of the new Presidential transportation initiatives will be reported in September 1980 and again at the end of the year.

Chapter 4

THE "656 COMMITTEE" AND WORKING GROUPS

4.0 INTRODUCTION

The "656 Committee" is the Interagency Federal Energy Policy Committee that was established by Section 656 of the DOE Organization Act to provide coordination in interdepartmental Federal energy management activities. It is composed of designated senior-level representatives of the Departments of Defense, Commerce, Housing and Urban Development, Transportation, Agriculture and Interior, the U.S. Postal Service, the General Services Administration, the National Aeronautics and Space Administration, and the Veterans Administration. The chairman of the committee is the Under Secretary of DOE and the Vice Chairman is the Administrator of the General Services Administration.

The "656 Committee" has established working groups to determine short-term actions to save energy in the following areas of concern:

- Transportation
- Buildings
- Acquisition Policy
- Products
- People
- Data Gathering and Reporting

The working groups are made up of "656" Committee members as well as representatives from agencies that are not presently members of the "656" Committee. The principal functions of the working groups are to define the barriers to effective programs, assess the strengths of existing efforts, and to generate cooperative solutions to immediate energy problems. The groups are designed to share information, to facilitate communications among agencies, and to suggest policy recommendations to the "656" Committee. The activities of each working group are discussed in the following section.

4.1 THE "656" COMMITTEE WORKING GROUPS

4.1.1 Transportation Working Group:

The Transportation Working Group acts to:

- Remove restrictions to allow Federal employees to use any existing shuttle for official business, irrespective of agency affiliation;
- Provide DECAT (Driver Energy Conservation Awareness Training) for all Federal drivers; and
- Encourage Federal fleet operators to inflate tires to the maximum recommended tire pressure (for Government vehicles).

4.1.2 Buildings Working Group:

The Buildings Working Group acts to:

- Institute a maintenance/operations training program to familiarize building owners, users, and facility maintenance staff with potential for energy savings;

- Develop a tenant agencies coordinator program; and
- Establish a products and procedures experience exchange to share energy-related knowledge.

4.1.3 Acquisition Policy Working Group:

The Acquisition Policy Working Group acts to:

- Relate procurement policy through a supplement to OFPP Policy Letter No. 76-1 to ensure that energy-efficient acquisition receives appropriate management emphasis.

4.1.4 Products Working Group:

The Products Working Group acts to:

- Incorporate life cycle costing formulas into the evaluation process for procurement of the 13 Energy Policy Conservation Act (EPCA) appliances;
- Limit procurement to energy-saving lamps;

4.1.5 People Working Group:

The People Working Group acts to:

- Publish two energy bulletins (150,000 copies for the National Capitol Region and 850,000 copies nationwide for tenants of GSA buildings) to instruct Federal employees on how to cope with the emergency building temperature restrictions;
- Develop an incentive awards program to recognize outstanding energy conservation by the Federal Government in the area of transportation;

- Research the Department of Transportation's METRO farecard payroll deduction system; and
- Develop an energy data bank or bibliography of energy conservation resources.

4.1.6 Data Gathering and Reporting Working Group:

The Data Gathering and Reporting Working Group acts to:

- Develop a comprehensive list of FEMP report requirements and energy terminology; and
- Analyze the requirements to simplify, standardize, and provide realistic reporting requirements and goals.

Chapter 5

V. CONCLUSIONS

Federal efforts to conserve energy from 1975 to the present have been substantial. Buildings and facilities energy use has declined consistently since fiscal year 1977 as more energy-efficient operating procedures were adopted and more energy-saving retrofits and renewables were installed in buildings each year; however, general operations energy use continues to fluctuate from period to period. In 1979, the overall 1.1 percent increase in energy consumed over that of 1978 was due primarily to an increase in general operations energy use by the Department of Defense. DOD attributes the increase to intensified training and operational readiness measures in the Mideast and Indian Ocean. However, if operational training and readiness fuel use is excluded from the overall Federal fuel use, the Federal Government shows a 6.1 percent decrease in FY 1979 overall energy consumption as compared to FY 1975. Civilian agencies actually decreased operations energy use between FY 1978 and 1979 by 2.1 percent, but this achievement was overshadowed by the magnitude of the increase in the DOD operations energy consumption.

Progress toward achieving the goals of Executive Order 12003 by those agencies for which progress could be measured show varying stages of agency accomplishment. Thus far, only progress toward the 20 percent reduction goal in owned Federal buildings can be measured, and only on an individual agency basis.

However, FY 1979 data does indicate considerable progress toward attainment of the 30 percent reduction goal in petroleum-based fuels. Overall, agencies had achieved a 12.9 percent reduction in petroleum-based fuel use in buildings and facilities by 1979.

Statistics in this report point to general operations as the major area of concern. While Defense operational training and readiness did account for the increase in general operations energy consumption, nine other agencies also increased energy use over that of 1978 levels. While progress has been significant in reducing energy use in buildings, increased emphasis is being placed on reductions of fuel use in general operations.

The agency general operations plans to be submitted in 1981, as well as the involvement of the "656" Committee in energy conservation activities, should significantly impact energy use in coming years.

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